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(54) ELECTRICAL CABLE

(71) We, KABEL- UND METALLWERKE GUTEHOFFNUNGSHUTTE AKTIENGESELLSCHAFT, a body corporate organised under the laws of Germany, of 271, Vahrenwalder Strasse, Hannover, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to an electrical power cable.

Known low tension power cables comprise a plurality of plastics material insulated conductors each consisting of a plurality of compressed aluminium cores, the conductors being of either circular or sector-shaped cross-section. In cables of this kind damage to the insulation may remain undetected for a long time if a short-circuit is not caused at the instant when the damage occurs, since, in contrast to paper insulated cables, plastics material insulation is not sensitive to moisture, so that even if a conductor is exposed by any damage, breakdown of the cable does not necessarily result.

If the conductors of a damaged cable are of copper, the cable installation is not necessarily endangered by the damage. An exposed aluminium conductor, however, corrodes in the course of time, until finally the conductor breaks. If the conductor is a phase conductor, the current path is interrupted and the damage becomes noticeable through loss of current. If, however, the conductor broken by corrosion is serving as the protective conductor, the breakage will not at first be noticed. Only when the protective conductor is needed, for example on occurence of an insulation fault in an appliance connected to the cable, is the damage discovered. Hence, the cable installation can remain not electrically isolated for some time, so that persons coming into contact with the installation are in danger.

It has already been attempted to prevent corrosion of multi-core aluminium conductors in low tension electrical cables by treating the cores forming the conductor by impregnating the surfaces thereof next to the surrounding plastics material insulation with a corrosion-inhibiting, adhering wax-like composition which is not liable to crack. Apart from the fact that the application of such a composition constitutes an additional operation during manufacture of the cable, the composition does not always meet the demands made on it, particularly as there is a constant risk that it may be rubbed off, even during manufacture.

According to the invention there is provided an electrical power cable comprising a plurality of conductors at least one of which consists of a plurality of compressed aluminium cores each individually covered with a layer of a metallic material, which material has a higher resistance to corrosion than the aluminium of said cores, the covered cores of the or each such conductor being contained in an individual sheath of electrically insulating plastics material.

With the cable of the invention a covering layer covers each core of the conductor individually, and thus prevents the propagation of local corrosion phenomena, from one core to neighbouring cores. Cables according to the invention can, without difficulty, be manufactured with existing manufacturing equipment, since the construction of the cables is no different to the construction of an ordinary cable. Moreover, ordinary commercial terminals and connectors can be used on the cable of the invention, so that no installation difficulties arise. Preferably said covering layers are of copper. Each of the covering layers can consist of a thin copper strip formed into a tube and welded at the edges.

Preferably all the conductors are contained in a common sheath of electrically insulating plastics material.

Two embodiments of cable according to the invention will now be described by way

of example with reference to the drawing, in which:—

Figure 1 is a cross-section through a first embodiment;

Figure 2 is a cross-section through a single core used in the embodiments; and

Figure 3 is a cross-section through the second embodiment.

Figure 1 shows a low voltage power cable comprising four conductors 1 to 4 each of sector-shaped cross-section and each consisting of a plurality of compressed cores. As shown in Figure 2, each core 25 consists of an an inner aluminium core 26 and an outer covering layer 27 of a metallic material having a higher resistance to corrosion than aluminium metallurgically bonded to the core 26. The layer 27 can consist of a thin copper strip formed into a tube and welded at the edges. The cores 25 of each of the four conductors 1 to 4 are contained in individual sheaths of electrically insulating plastics material 5, 6, 7, and 8, and the conductors 1 to 4 are all enclosed by a common plastics material sheath 9. Beneath the sheath 9 is a tape wrapping 10 which holds the conductors 1 to 4 together. Interstices between the conductors 1 to 4 contain filler threads 11 and 12. Instead of the tape wrapping 10 and the filler threads 12, an extruded coating, for example, a rubber-containing mixture, may be applied to the cable.

Figure 3 shows a low tension power cable comprising four conductors 13, 14, 15, and 16 each of round cross-section, and each consisting of a plurality of cores 25 as shown in Figure 2, compressed together.

The cores 25 of each of the conductors 13 to 16 are contained in individual sheaths of electrically insulating plastics material 17, 18, 19, 20, and are all enclosed in a common plastics material sheath 21. The sheath 21 has an outer sheath 22 disposed thereover, and both sheaths 21 and 22 may be made of a plastics material based on polyvinyl chloride. Armouring 23 is provided, in known manner, between the sheath 21 and the sheath 22.

From the point of view of safety it is sufficient for only one of the four conductors (1 to 4 in Figure 1, and 13 to 16 in Figure 3), namely the neutral or protective conductor, to be constructed in the manner described, i.e. of cores as shown in Figure 2, the other conductors being of only aluminium.

WHAT WE CLAIM IS:—

1. An electrical power cable comprising a plurality of conductors at least one of which consists of a plurality of compressed aluminium cores each individually covered with a layer of a metallic material, which material has a higher resistance to corrosion than the aluminium of said cores, the covered cores of the or each such conductor being contained in an individual sheath of electrically insulating plastics material.

2. A cable as claimed in claim 1, in which said covering layers are of copper.

3. A cable as claimed in claim 1 or claim 2, in which each of said covering layers consists of a thin copper strip formed into a tube and welded at the edges.

4. A cable as claimed in any preceding claim, in which all the conductors are contained in a common sheath of electrically insulating plastics material.

5. A cable as claimed in any preceding claim, in which the conductors are each circular in cross-section.

6. A cable as claimed in any one of claims 1 to 4, in which the conductors are each of sector-shaped cross-section.

7. An electrical power cable substantially as hereinbefore described with reference to Figures 1 and 2, or Figures 2 and 3 of the drawing.

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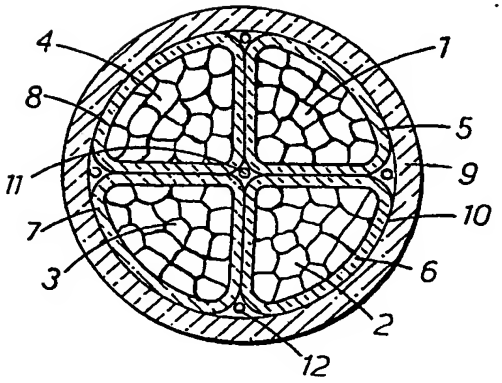
Fig.1.



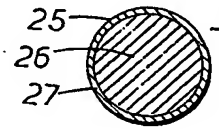


Fig.2.

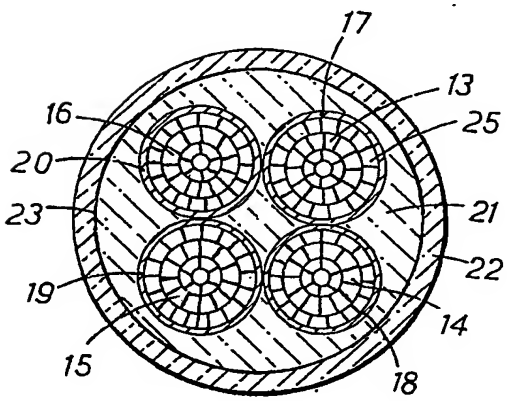


Fig.3.